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Resolution of Groundwater Quality
Interference Problems, Revised 1993



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1.0 Introduction

This document is intended to facilitate implementation of Guideline B-1: "Water Management -- Guidelines and Procedures of the Ministry of Environment and Energy" (under revision). It describes the Ministry position in dealing with the abatement of groundwater contamination caused by activities that are not being done under a Certificate of Approval from the Ministry. These activities include, but are not limited to:

- a) spills or accidental discharges of contaminants
(EP Act Part X, Guideline G-1)
- b) discharges of contaminants from facilities that have been used for the disposal of wastes but are now closed.
(EP Act Part V, Guideline D-4)
- c) discharges of contaminants from ongoing or past activities not associated with the disposal of waste such as the decommissioning an industrial facility.
(EP Act Part II, Guidelines for Decommissioning and Clean-up of Sites).

Guideline B-7: "Incorporation of the Reasonable Use Concept into MOEE Groundwater Management Activities" addresses Disposal Sites with Certificates of Approval.

2.0 Background Assumptions

As a result of a detailed review of many factors, including Part X of the Environmental Protection Act, RSO, 1980 (and the report of the Abatement Procedures Committee), the following assumptions have been made by Working Group V in Developing guidelines and procedures for resolving groundwater quality interference problems:

- (1) It is the policy of the Ministry to ensure that action is taken to clean up and restore the environment in such a manner that inconvenience to the public and environmental damage are minimised. This includes action for restoring affected water supplies or providing alternate sources for these supplies affected by a third party.

This does not imply that the Ministry is responsible for the contaminant discharge with respect to its cause or for any costs which might be incurred for restoring the environment, for restoring affected water supplies, or for damages to individuals. Such costs are ultimately the responsibility of the person who caused the spill and/or the person owning or having control of the contaminant.

- (2) Legislation and resources are, or will be, available which will allow the Ministry to require the clean-up and restoration of the affected supplies.
- (3) The resolution of groundwater quality interference problems is not dependent upon the availability of funds from either the person who has caused, or is accused of causing, the contamination, or the person damaged by the interference. Funds for investigation, clean-up and/or restoration are, or will be, available to the Ministry.

The following is a conceptual outline of the proposed policy approach to the resolution of groundwater quality interference problems:

- a) The Ministry has jurisdiction over the investigation, clean-up and restoration of the environment and/or water supplies;
- b) the action necessary to resolve these cases can be taken by the polluter, the affected party, the Ministry, the municipality or others;
- c) there are a number of mechanisms available to ensure that the appropriate action is taken. These include the use of Ministerial Orders, outside consultants, voluntary support from either the polluter or the affected party, or by the Ministry, the municipality or others doing the work required.

3.0 Decisions to Permit Implementation

A number of administrative decisions have been made to facilitate the implementation of the guideline.

3.1 Responsibility

It is the policy of the Ministry in all cases and at all times to ensure that action is taken to resolve groundwater quality interference and this responsibility will not be abdicated when delegated to, or assumed by, any other party. This guideline applies to the clean-up of contaminants in the environment and the restoration or replacement of groundwater supplies (e.g. water wells, springs). The Ministry may (when necessary) order, request or hire someone to carry out the required work to its satisfaction.

This does not detract from the responsibility of the owner of the contaminant or the person having control of the contaminant to pay for all costs associated with the contaminant discharge including the investigation, the clean up of the environment, and the restoration of affected water supplies and to do all that is practicable to minimize damage caused by the contaminant discharge and to facilitate clean-up.

Where it will not substantially impede the resolution of a problem the polluter will be given the opportunity to act in any or all aspects of the clean-up, investigation or restoration. However, when the Ministry is not satisfied with the progress being made by the polluter, the Ministry will proceed to resolve or alleviate the problem using whatever resources are available and appropriate. Where pollution is a "spill" under Part X of the Environmental Protection Act, the polluter has a clear duty to clean up, and specific tools are available to the Ministry (see Sections 93, 94, 97 and 100).

The required resolution of each case with respect to clean-up and restoration will be determined and specified by the Ministry and will depend upon site-specific conditions. Implementation procedures timing and operational considerations are presented in Appendix A and Appendix B.

3.2 Timing

The Ministry will ensure that appropriate action is taken as quickly as possible to minimize public inconvenience and environmental damage.

3.3 Action Plan

In all cases, an Action Plan (See Appendix A and B) for resolving the problem will be prepared early in the proceedings before substantial funds are expended or costly corrective action ordered. The Action Plan should take the following into consideration:

- the anticipated scope, timing and methodology of:
 - o investigation;
 - o clean-up;
 - o restoration;
- the anticipated legal and administrative action for closing out the problem and collecting funds, should this be necessary.

3.4 Funding and Costs

Prior to any extensive investigations, the costs of the proposed resolution - including investigation, clean-up and restoration - shall be weighed against the benefits of doing the work. This cost/benefit assessment should be considered in the Action Plan (Section 3.3 and Appendix B)

Where it is anticipated that costs to the Ministry for the investigation, clean-up and restoration will be significant, the Regional Director will have to seek funds from an appropriate source, such as the Security Account.

3.5 Clean-Up

The Ministry will decide on a case-by-case basis what, if any, level of clean-up it will require or undertake. (see Appendix B)

3.6 Restoration

The permanent restoration of water supplies which have been significantly affected and the provision of temporary supplies will be required or undertaken in cases where the problem is caused by a third party (not the complainant), whether or not the specific origin of the contamination can be identified.

No restoration will be undertaken where the problem is:

- self-induced;
- of a natural cause, or
- insignificant. (see Appendix A. 4)

APPENDIX A

IMPLEMENTATION PROCEDURES AND TIMING OF MINISTRY RESPONSE TO COMPLAINTS ABOUT CONTAMINATED WATER SUPPLIES

1. Ministry personnel will acknowledge by telephone, mail or a site visit each complaint or notification of contamination within three working days. Where a public health or safety factor is identified, the Ministry must respond immediately and in accordance with Guideline G-1.
2. As soon as practicable after the initial response, the Ministry will place the problem in one of the following categories:
 - (a) the contamination is from a natural source;
 - (b) the contamination is the fault of the owner;
 - (c) the contamination is insignificant and thereby does not require Ministry involvement;
 - (d) the contamination is significant and derived by "unnatural" processes from an outside source or a third party (the particular source does not have to be specifically identified at this stage);
 - (e) the contamination cannot be attributed to any of the foregoing.

Special circumstances which might require some delay at this stage are:

- (i) where poor well construction causes complications which make it impossible for the Ministry to categorize the problem. Under these conditions, the Ministry will require that the owner rectify this well construction problem before it proceeds with any further action or investigation;
 - (ii) where the Ministry wishes the well owner to undertake some work, perhaps pump the well to waste or retain a contractor to clean out the well, before the Ministry is able to categorize the problem.
3. Category (a), (b), or (c)
If it is determined that the contamination is (a) natural, (b) the fault of the owner, or (c) insignificant, the Ministry will withdraw from the problem.

If the complainant is not satisfied with this decision, he/she may proceed independently to investigate the cause of the problem. The Ministry may be re-involved based on the results of this investigation.

4. Category (d)
If the contamination is identified as (d) from an outside source, the Ministry will ensure that the complainant is provided with a temporary water supply until arrangements can be made for a permanent supply.

Temporary and permanent supplies will be provided under the following conditions:

- (a) where the Ontario Drinking Water Objectives for health related parameters are exceeded. These objectives are listed in Ministry Guideline B-1 "Water

Management -- Guidelines and Procedures of the Ministry of Environment", November 1978, Revised May 1984. The most recent water quality data are available from the Program Development Branch.

- (b) at the discretion of the Regional Director where the Ontario Drinking Water Objectives for non-health-related parameters are exceeded.
- (c) on the advice of the Medical Officer of Health.
- (d) on the advice of a veterinarian when the water is to be used for livestock.

Temporary or permanent water supplies will only be provided where the increase in the concentration of a contaminant from an outside source, is considered by the Regional Director to be significant.

Temporary or permanent water supplies may be provided by the complainant, by the person responsible for the contamination, by the municipality, or by the Ministry. These supplies must be acceptable to the Ministry.

5. Category (e)

If the cause of the complaint cannot be identified as (a), (b) or (c), or the contaminant cannot be identified as (d) from an outside source, the investigation will continue. The major objective of this continuing investigation will be to classify the complaint to either justify the provision of a temporary supply or to indicate whether or not the Ministry should withdraw from the problem.

A temporary and/or a permanent water supply will be provided only if the problem has been classified as (d) from an outside source, or if this is expressly directed by the Regional Director. The Director may allow provision of a temporary water supply when there is good reason to believe that the contamination is from an outside source (d) but evidence is not as yet conclusive.

6. Preparation of Action Plan

If after the contaminant has been determined to be from (d) an outside source, and a temporary supply has been provided, or if the cause of the complaint is (e) not identified, and the Ministry is still involved, the Ministry will prepare an Action Plan. This Action Plan will be prepared and communicated to all interested parties within a maximum of 25 working days following receipt of the complaint. It will outline a program (critical path method or some other approach that ensures consideration of all alternatives and the necessary decisions) for dealing with the problem.

The Action Plan prepared at this stage may be subject to modification as more data are collected but it should be completed at this early stage in the proceedings, at least in a tentative format. This is necessary for a number of reasons. For example, the extent of the hydrogeologic appraisal of the problem will be dependent on factors such as the acceptability of various procedures for supply restoration, the need for detailed data to support legal actions and the need for the identification of the source of the contaminant.

The Action Plan should specify the following:

- (a) The critical stages in the investigation and resolution of the problem and potential legal action, as well as the chronology for these stages.
- (b) The deadlines for the provision of a temporary water supply and the time in which the Ministry will make a commitment to the home owner to provide a permanent water supply if this is shown to be necessary.

The Action Plan should also identify potential sources of permanent water supplies. However, the time necessary to restore the supply on a permanent basis is difficult to specify as it depends on such factors as the availability of contractors and agreements with municipalities for connections to municipal systems. This time must be specified once a commitment is made for a permanent supply. However, delays of greater than two months to evaluate the rate in which the contaminants will be attenuated by natural processes after the cause of the contamination has been identified will not normally be acceptable.

APPENDIX B

OPERATIONAL CONSIDERATIONS

Action Plan and Cost/Benefit Assessment

As addressed in Appendix A, Part 6, an Action Plan is required in cases where there is interference with groundwater supplies. This Plan is either developed by the person responsible for the contamination and approved by the Ministry, or by the Ministry. The Action Plan is intended to speed up the Ministry internal decision-making process so as to eliminate unnecessary inconvenience to the public caused by delay in restoring water supplies. In cases where groundwater supplies are not involved, an Action Plan is not required; however it is strongly recommended as a means of developing an efficient contaminant abatement program.

A basic part of any Action Plan is an assessment of the potential costs and benefits of any abatement and water supply restoration. This assessment is necessary even where an Action Plan is not prepared. The Action Plan should also specify the level of clean-up that will be required. As noted below a complete clean-up may not be feasible.

The following general principles apply to the abatement of groundwater interference problems:

1. In any cost evaluation (the cost of clean-up, and/or the cost of restoration, versus the benefits of doing the work), clean-up will be required unless the costs for clean-up are far in excess of any benefits. In general, the availability of inexpensive alternative supplies and/or treatment methods will not be considered as a reason for not requiring environmental clean-up.
2. Some contaminants cannot be completely removed from the subsurface with the technology that is currently available. This applies in particular, to non-aqueous phase liquids. Although it may sometimes be possible to remove the contaminating liquids themselves, it may not be feasible to remove all of the contaminants dissolved in the soil water or sorbed on the soils. Under these circumstances, although an extensive "clean-up" may remove the bulk of the contamination, it may not return the associated groundwater to a condition where it would serve a drinking water supply.

Other circumstances where complete clean-up may not be feasible would be where the contamination is from a source that cannot be practically removed, such as large mine tailings areas or waste disposal sites.

Where such conditions exist the only practical abatement options may be to control the further spread of the contaminants and/or to restrict the use of the groundwater in the area that is already contaminated and/or to re-supply the affected users with potable water from another source. Such options would require that arrangements that are satisfactory to the Ministry be made with the owners of any affected lands. It may be necessary to attach such arrangements to the title to the land.

Considerations in Determining the Scope of the Investigation

The following factors should be taken into account in determining the extent of an investigation intended to isolate the source of contamination:

1. Some hydrogeologic environments are particularly difficult to evaluate and to investigate and some contamination cases, particularly where more than one possible source is present, may be extremely difficult to resolve. Where success seems unlikely, an inordinate amount of money should not be spent in seeking the source of the contamination.
2. There is little point in pursuing an exploration program, the only purpose of which is to positively identify the owner of a contaminant or the party responsible for the contamination, in cases where only an insignificant portion of the costs associated with the exploration program and the resolution of the problem (clean-up, restoration, and exploration costs) could be recovered from any of the parties who might be found responsible for these costs.
3. Where the cost of resolving a problem are significantly less than those than those involved in identifying the owner of the source of the contaminants and the legal costs, the Ministry should proceed with the environmental clean-up and the restoration of water supplies as necessary, without attempting to assign responsibility for the problem.

Considerations in Determining the Extent, Urgency and Method of Environmental Clean-Up

The following factors should be taken into consideration in establishing the extent and urgency of clean-up programs:

1. The availability and cost of alternate sources of water.
 - (a) area serviced by a public water supply;
 - (b) nearby surface water available;
 - (c) alternate aquifers available;
 - (d) alternate sources of water are not available except at exorbitant costs.
2. The practicability of treating the contaminated supplies to an acceptable level.
3. The number of wells which have been or are likely to be affected by the contamination and the number of people involved.
4. The potential for restricting the use of groundwater in the contaminant plume (for example, by buying the land).
5. The quality of the 'natural' groundwater in the area.
 - (a) naturally poor
 - (b) previously contaminated.

6. The potential for mineral extraction from the groundwater.
7. The impact (corrosiveness) of the contamination on buried utilities, building foundations etc.
8. The potential for impact on nearby surface water.
9. The time which could be required for the natural attenuation of the contaminants in the groundwater (days, years, indeterminate).
10. The toxicity of the contaminants.
 - (a) toxic at levels below which the water supply would be rejected because of an unpleasant taste and/or odour;
 - (b) toxic at levels exceeding those where the water supply would be rejected because of an unpleasant taste and/or odour.
11. The rate at which the contaminant plume is expanding. This would determine the urgency for action to reduce:
 - (a) the cost of the clean-up;
 - (b) the spread of the contaminants, etc.

Where dealing with an "old" contaminant plume which can be shown to be relatively stable, some delay may be acceptable.

12. Potential for interference with activities on the ground surface.

Considerations in Determining the Method of Temporary Water Supply Restoration

In most cases the establishment of the initial temporary water supply will be by a trucked supply to a temporary tank. There will, however, be some cases where alternate methods will be preferable either because of expense or convenience. For example, it may be acceptable to provide a hydrant in a public place and allow the affected parties to carry their drinking and cooking water home.

Considerations in Determining the Method of Permanent Water Supply Restoration

The method by which an affected water supply will be restored will be selected primarily on the basis of cost and convenience to the user. Cost estimates will consider the maintenance of the system, the time it will have to operate (e.g. considering natural attenuation of the contaminant), and the possibility that contamination will spread and affect additional water supplies and the system will have to be expanded.

Methods of permanent restoration include:

1. Connection to a municipal supply.
2. Drilling a new well, reconstruction or deepening of an existing well.
3. Treatment of the contaminated supply.

4. Use of a source of surface water.
5. Hauling of water by truck.

Where large costs are involved in the final restoration of water supplies, a decision on this final restoration may be delayed pending the results of an exploration program to designate the best source for the new permanent supply.

Use of Outside Experts, Consultants, Contractors and Municipalities

In most cases, Ministry personnel will carry each case up to the stage of documenting a strategy (i.e. preparation or approval of the Action Plan) for the resolution of the problem. At that point, consideration may be given to employing assistance from outside the Ministry. Variations from this approach may be taken at the discretion of the manager involved.

Notification of Parties Responsible for the Contamination

When the source of the contamination has been defined to a high level of certainty, notification will be sent to the parties believed to be responsible for the contaminant discharge and they will be given an opportunity to participate in the resolution of the problem. If no response is received within ten days, or if the response is negative, the Ministry will proceed independently or issue an order requiring action by the responsible parties.

In cases where there is a reason to proceed expeditiously, proceedings will not be delayed to accommodate participation by the parties responsible for the contaminant discharge.

A party affected by the contamination should not be inconvenienced by delays in restoring the water supply on a temporary or on a permanent basis caused by this notification.

Restoration of Supplies in Serviced Areas

From time to time, supplies in serviced areas may be affected by a municipality in its performance of its public service. Causes would include:

- contamination due to winter road maintenance (see also discussion of road maintenance activities in the following section);
- the storage of road salt or sand/salt mixtures;
- blasting for sewers etc.;
- leaking gasoline storage tanks;
- leaking sewers, etc.

Under these circumstances, the owner of a contaminated well may be asked to connect to the municipal supply. Under Section 100, EPA, a person is entitled to compensation for loss or damage incurred as a direct result of a spill. Where there may have been a spill, the Environmental Compensation Corporation may be contacted at 416-323-4826 (collect).

Contamination of Supplies by Road Maintenance Activities

Where a water supply or the environment has been contaminated by road deicing materials originating in a storage area, the problem will be the responsibility of the responsible road authority and will be handled in accordance with this policy and these

guidelines. Where the contamination is from the application of deicing chemicals on a road for the purposes of deicing, Ministry Guideline B-3 entitled: "Resolution of Well Water Quality Problems Resulting from Winter Road Maintenance" applies.

Bacterial and Nitrate Contamination - Septic Systems and Feedlots

Under this guideline, the Ministry will not be responsible for the resolution of bacterial or nitrate contamination problems caused by a number of septic systems interfering with wells in a sub-division. The Ministry Private Servicing Funding Program may have applicability in these situations. Normal procedures for the restoration of the environment and the water supply can be followed however, where one particular source of either nitrate or bacteria, outside the sub-division, such as a feedlot or another subdivision can be identified. Temporary supplies will be provided in such cases only after a particular outside source is designated.

This position was adopted as it was felt that the Ministry could not or would not wish to:

- a) provide temporary supplies for entire sub-divisions under this guideline, without hope of recovering the costs;
- b) designate specific cause and effect for individual well and septic tank systems (usually a Medical Officer of Health responsibility) or provide temporary supplies for such individual problems.

Federal Projects

Contamination originating on Federal projects is not the responsibility of the Ministry. The Ministry will act as necessary to liaise with Federal authorities.

Leaking Sewers

Normal procedures for supply restoration will be followed where contamination is attributed to a leaking sewer in an area where there is not a municipal water supply service.

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